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Chesnut

An Inaugural Essay

on the

Importance of Position in

Surgical Diseases. Passed March 3 1829

Submitted to the Medical Faculty

of the

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For the Degree of Doctor of Medicine

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of Pennsylvania.

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The treatment of surgical diseases, has been much improved within the last half century, & may now be considered nearer perfection, than at any former period.
Much as has been written, & great as is the light which has been thown on the principal, & more leading parts of the art; Yet many surgeons, have paid too little attention to, & not laid sufficient stress on directions, which might to some appear unimportant & unnecessary.
Diseases apparently, of less moment & less interesting to the surgeon, have been rather neglected & allowed to move on their course, without much being done to improve their condition.
This is in a great measure, to be attributed to the fame & reputation generally acquired by bold & capital operations, when successfully performed, such having more effect with the public, than the well conducted & judicious

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treatment of diseases which do not appear to be of so much consequence.

An evidence of this is seen, in the slight importance which some surgical writers attach, to the position of the patient, in certain diseases, & by others the total neglect of it.

Many diseases & accidents might be enumerated, which have suffered by not attending to this very important point, & particularly those of the extremities, such as inflammation, contusions, wounds. Ulcers, inflammation of the hip, knee, & ancle joints &c.

It is proposed in this essay, to consider those diseases in which the treatment is assisted by position, & the application of this direction as a foundation for the cure, & an essential part of the surgeons duty in such diseases.

The subject will be treated of under the following different heads.

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1st The effect of position on the circulation of the blood.

a. On Hemorrhage.

2nd Position in inflammation.

a. Abscesses.

b. Burns.

c Ulcers.

3rd Position in inflammation of the joints.

4th Wounds.

a Incised wounds

b Punctured & contused wounds.

c Wounds of particular parts.

d wounds of the veins.

1st The effect of position on the circulation of the blood.

It is well known that the circulation of the blood,

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is greatly dependant on the action of the heart, & the latter is very much influenced by muscular action. Exercise or in other words muscular action, will increase the action of the heart, according as it is violent. The greater strength, fullness, & frequency of the pulse, during violent muscular action, may be observed by every one who directs a little attention to his pulse. Muscular action less violent, will also increase the action of the heart & arteries, in a lesser degree, & ~~than~~ more especially if the person has been debilitated previously.

The pulse is more frequent in a sitting posture, than when recumbent, & still more frequent in the erect position.

This difference in the action of the heart & arteries in the several postures, is explained by recollecting, that more muscles are in action when in the erect posture, than are necessary to maintain a sitting posture, & more muscular

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action is necessary when sitting, than is employed in the recumbent position. Hence the necessity of keeping patients in the recumbent posture, when we wish to diminish the action of the heart & arteries.

Syncope is more easily induced by bloodletting, when the patient is in the erect position than when lying, & this may appear to contradict what has just been said respecting the recumbent position. But bullen explaining how syncope is more readily induced by loss of blood in the erect position, in the following manner; "Whether hæmorrhage be spontaneous, accidental, or artificial, in order that the functions of the brain shall be regular or healthy, a certain quantity of blood to the brain is necessary. If this is diminished syncope may be the result, as proved by the fact that the effect will not be so apt to take place, if the patient is laid in the

* Cullen's Practice Vol. 2 page. 103.

vicinity position. This increases the afflux of blood to the arteries & retards the return of it by the veins, & thus preserves the necessary fullness of the vessels of the brain."*

Physicians, and surgeons, frequently direct blood-letting to be carried to the extent of producing a general impression on the system, & this is evinced by syncope or an approach to it. In performing the operation with a view of inducing syncope, & to obtain the advantages thus produced, the position in which the patient is placed, ought always to be borne in mind. Because the quantity of blood which might be abstracted whilst standing, or sitting, may be so small as to have little or no effect, in a case of violent inflammation of an important organ, & yet the patient may faint under the abstraction of 4 or 5 oz of blood.

the cases of this kind, the patient is to be placed in the recumbent posture, in order that sufficient blood may be taken to have a decided effect on the inflamed part.

On the contrary, when it is desired to produce a general relaxation of the muscular system, by bleeding, as in dislocations which are difficult to reduce the patient is placed in the erect posture, so that the desired effect may be thus obtained, with the loss of the least quantity of blood.

In a note to Sir Astley Cooper's lecture, Mr Yarnal mentions the following case which is in point.

"A stout man was admitted into Guy's Hospital having a simple fracture of the tibia with considerable contusion of the surrounding parts; a day or two after his admission, he had some constitutional irritation, & acute pain with spasmodic action of the muscles

*Coopers lectures by Tyrrel Note page 34 Vol. 1st

ma. the seat of the injury. To relieve these symptoms, the drafter was directed to take some blood from the arm of the patient, which he did, but thinking it proper that faintness should be produced, as a proof of its effect on the constitution, & forgetting that the patient was in a recumbent position, he abstracted so large a quantity of blood that all power of restoration was completely annihilated, & the man died"*

Although the circulation of the blood is not effected upon Hydraulic principles, yet to a certain extent, the blood is affected by the laws of gravity, whilst moving in a direction contrary to its own weight. The blood is diminished in velocity & in quantity, when it must ascend against its gravity. This is seen in the effects produced

by bloodletting as already mentioned, on the quantity of blood circulating in the brain; according as the position is varied, & its return to the heart is facilitated by the erect position.

If the velocity of the blood is diminished, when it has to ascend by the arteries, & its return by the veins being thus at the same time favoured by position, it follows that the quantity of blood in the part to which it is sent must be diminished.

a, Position in Hemorrhage.

Hæmoptysis, is said to be most frequent in the night, owing to the position of the patient, the lower extremities being flexed, & thus inducing a greater determination of blood to the lungs. In the treatment of this Hemorrhage, we are told by Dr Chapman

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to elevate the head & shoulders, & extend the lower extremeties.

Epistaxis is sometimes brought on in those who are subject to it, by having the head lower than usual, & in treating such cases, the erect or sitting posture is recommended.

In the treatment of Uterine & Hemorrhoidal bleedings, the patients are directed to be kept in the horizontal position, with the hips elevated.

In all cases of hemorrhage which are accidental, the elevation of the part from which the bleeding proceeds, will have a tendency to diminish the flow of blood, if the bleeding vessels are not large. In wounds, where the vessels divided are so small as not to require a ligature & yet do bleed, the part should be elevated, & more especially, if it be one of the extremeties.

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2nd Position on Inflammation.

When a part is in a state of inflammation, it is pretty evident that the velocity of the blood in the vessels of the inflamed part is increased. The quantity of blood in the affected part is also augmented.

To diminish this activity of the vessels, & lessen the increased quantity of blood, is a leading indication in the treatment of inflammation. And one of the most efficient means of fulfilling this indication is local bleeding. The position in which the part is placed, will also have great influence over the circulation of blood in it.

When a limb is put in a depending position, the motion of the blood in the arteries is favoured, & that of the veins retarded, which will have a tendency to increase the congestion in the part.

* Hunter on the Blood page 123.

It is well known that the pain & swelling are increased, if a limb be allowed to remain dependent when it is inflamed, & that a change to a horizontal or elevated position, will have the effect of diminishing the pain & swelling.

Mr. Hunter ascribes the increase of pain in a dependant part to an increase in the length of the column of blood in the veins.* By keeping a limb elevated we accomplish in some degree what is done by local bleeding. The increased quantity of blood in the part, will gravitate to some other part, & if the position be maintained, the blood will ascend with greater difficulty, & return by the veins more readily.

The practice of elevating parts when inflamed, & for the suppression of hemorrhage, has been established by Dr. Physick, & it is one of the

numerous instances of a direction, apparently trifling & unimportant in itself, but being attended to, leading to results the most happy. The principle is as simple, as the practice is useful.

Dr. Physick has been able by position alone, to relieve pain & remove inflammation, & to effect the most perfect cures, after other remedies had failed. It is said he was first led into the practice, by observing that ladies, who were anxious to have delicate looking hands, kept them elevated, & being so "successful in their hands", it was reasonable it would be so in other cases.

In all cases of inflammation, much advantage is gained by elevating the part, if it can be done. This applies more especially to the extremities, but is also applicable to other parts. Thus in inflammation

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of the mammæ, or in that termination of inflammation denominated schirrus, the patient is to be placed in the recumbent posture, & on the opposite side, to cooperate with other means in lessening inflammation, or removing the induration.
In hernia humoralis the recumbent posture is recommended. In phymosis Dr. Harris recommends the parts to be kept elevated to assist in reducing the inflammation of the glans. In a word, any part that is in a state of inflammation, ought to be kept elevated, unless there is some good cause to prevent it. I do not know that the practice is generally adopted in inflammation of the brain, but at present know no objection to it, & the probability is that benefit would result in all cases of too great determination of blood to the head, by

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elevating it above the level of the remainder of the body, & favor the return of blood, & drain it from the head.

In the erect posture, the venous blood is interrupted & impeded in its circulation by gravity, & perhaps the capillaries assuming an increased action, & secretion of serum, cause an edema, or dropsical effusion, this being an effort to relieve the larger vessels.

Where inflammation terminates in effusion in the cellular membrane, or where this effect is produced by other causes, the absorption of the fluid is assisted, subsequent accumulation prevented by position.

In edema of the lower extremities, bandages are often used to support the cells, & diffuse the fluid & not allow it to accumulate. Analagous effects are obtained by elevating the limb, the effusion is more readily absorbed,

because there will be a greater number of absorbents acting on the effused fluid to be absorbed. After fractures of the leg, the inflammation sometimes runs so high, & the swelling is so great, as not to admit the splints to be applied. Cases of this kind I have seen treated at the Pennsylvania Hospital, by elevating the limb, & applying cold water, & in a short time the inflammation was reduced, & the swelling removed, so that the appropriate dressings could then be applied, without doing injury. This may be done either by elevating the foot of the bed, as recommended by Dr. Physick, or using inclined frames for the limb to rest upon. Blood is by this means detracted from the limb, & the inflammation, & swelling are reduced.

Perhaps the same practice would be beneficial in the oedematous swellings of the lower

extremities of puerperal women, called Phlegmasia Dolens.

a. Abscesses.

Inflammation having terminated in the secretion of pus, it is of some importance to remember, that this fluid will generally tend to the most depending part, as in mammary & psoas abscesses. When an opening is made for the evacuation of the pus, it should therefore always be made in the most depending part of the abscess, unless its situation will not admit of this being done. Sometimes counter openings are made, in such cases chances of restoration will often suffice for the evacuation of pus, without making a counter opening, as one or the other may be most suitable for one's particular case. Fistulas sometimes result in consequence of abscesses not having a free & depending opening.

6. Burns.

To prevent union of separate parts by granulations, & the deformities which sometimes results after burns by the contraction of cicatrices, it is very necessary to attend to the first indications, & rectify errors in this respect. The granulating surfaces & cicatrices of burns are frequently large, deformities are more frequent in these cases. But as cicatrized surfaces have the property of contraction, it is right that the position be such, as to prevent deformity as much as possible.

Dr. Astley Cooper relates a case where the chin had become united to the breast, the arms to the sides, & the upper arm to the forearm. Fingers are sometimes united to each other by union of granulations at the sides.

Burns about movable articulations, are very apt to embarrass the motion of such, until

after they have recovered, & the subsequent use of a limb may thus be very much limited.
I have seen the fingers little hermanently extended by burns on the back of the hand.
About a year ago I saw a patient on whom Mr Gibson operated, whose arm was confined to a flexed position by the effect of a burn on the anterior part of the elbow joint. The thigh may be united to the abdomen by union of granulations.
In all such cases, where there is danger of deformity, such can be done to prevent it during the healing.
The union of separate parts can be prevented by the interposition of lint, or strips of linen spread with simple cerate. The incidental contraction of cicatrices, may be prevented by cotton, sponge, bandages.
If the burn be on the chest or neck or breast, the head is to be kept thrown backwards. If a joint is uncovered it ought to be kept in a position, which will resist deformity.

* Hunter on the Blood, page 390.

c. Ulcers.

The experience of surgeons, both ancient & modern, proves that an ulcer on the leg is far painful & will heal with more difficulty if it be kept in the horizontal position, than if the limb is dependent. Granulations on an ulcer when the leg is in the horizontal position, may be of a healthy gland red color, & look healthy but as soon as the position is changed to an erect one, the ulcer will have a purple hue, from the engorgement to venous circulation, pain & swelling will be increased, & the ulcer assume an unhealthy aspect. Mr. Hunter says, "in the erect position the vessels formed rapidly are not able to support the increased column of blood, & to act against it, which proves that a stagnation of blood is produced, sufficient to alter the chance in a vital."*

Some surgeons are disposed to heal ulcers in the horizontal position, & advise bandaging the

rest with a roller, & have the patient to walk about, under the impression that the cure is thus effected, all be more permanent, & Underwood advises his method but the experience of a great number of surgeons, does not warrant this proceeding. The plan of leading Allow for rolling a bandage, has ultimately pretty much the same effect as an elevated position of the limb would do. If capillary vessels are injured in the roller & bandage, & by elevating the limb, there would be such surplus, at all events it will not be so necessary. The venous blood is not impeded, & the capillaries will be less apt to effuse large quantities of serum, & cause oedema.
In the inflamed, & irritable Allow, the bandage, or a bed is better, as elevated position of the limb, is of great utility. Without such immediately on the point, it will be found very difficult & embarrassing, to treat

Ulcers of this kind. Dr. Gibson has obtained great benefit in the treatment of ulcers of the legs at the Almshouse, by placing them over inclined frames considerably elevated. Cases, I have seen at the Hospital, assume a healthy aspect in a short time, by proceeding in a similar way.

Varicose Ulcers being produced by the too great distention of the veins, & separation of their walls, so that the valves are incapable of approximation, consequently the length of the column of blood in the veins being increased, inflammation is produced by irritation, & distention, & ulceration supervenes. It would be absurd in the treatment of this species of ulcer, not to regard the position in which the limb is placed. Writers generally recommend the horizontal position, but it is reasonable that securing the limb, would be still more beneficial.

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3rd Inflammation of the Joints.

Position is very important here, both as regards the cure of inflammation, & the prevention of deformity.

To detract blood from the joint, the limb is directed to be considerably elevated by pillows, a wall ladder inclined plane, or elevation of the foot of the bedstead.

Surgeons are chiefly indebted to Dr Physick for a knowledge of this practice, & by him much importance is attached to it. The benefit of local bleeding is obtained in this way, & where the knee or ancle joint is inflamed, it should never be neglected. The practice is applicable to sprains, wounds or other injuries of these joints.

In inflammation of the synovial membrane, or in the scrofulous inflammation of the bones, called white swelling, much good is effected by taking off the force of the circulation by an elevation

position of the limb. But besides this, the part must be kept perfectly at rest, which is indispensable in effecting a cure.

Inflammation of the elbow, or wrist joint, is likewise, by elevating the arm, much relieved.

But independent of the reduction of inflammation in any joint, position is of the utmost consequence in preventing deformity. When inflammation is very violent, Anchylosis is very apt to be the result, & this being the case, the limb will afterwards be useless, or burthensome, according to the position it has been assumed. To relieve acute pain in inflammation of the hip, knee, or other joints, are very much in the habit of bending the limb, & anchylosis taking place under these circumstances, the member is not only useless, but is rather an encumbrance for ever afterwards.

The patient on whom Dr. S. T. Dixon operated, & made an artificial joint, had a deformed limb in consequence of inattention to position during high inflammation.

For the time required a leg at the Almshouse that was rendered at right angles to the thigh, became useless. And then a patient, a fine man in the Convalescent Hospital, had had a similar deformation of the knee, with the leg at a right angle with the thigh. The limb was in this position when he was admitted. It was found impossible to correct it afterwards.

It should therefore be made a rule, in every case, to bend the joint in the direction which will be most useful, should such an accident happen.

The fact in these cases is to be kept at right angles to the leg, and in the ancle joint which is inflamed. If it be the knee, the leg must be extended. When the elbow-joint is inflamed, it is obvious that the arm will be most useful in a flexed state, & hence Dr Physick recommends the angular splints in fractures of the condyles of the humerus. But the

should not take place in the fracture would be, is not always by anchylosis, but also by the condyles may be rendered to remain in an improper position. Patients labouring under hospitalism in this disease, are very much inclined to bend the thigh on the pelvis, & the leg on the thigh. To correct this habit as early as possible, is one of the most indispensable in the treatment of the disease. This should always be attended to at the commencement of the disease, because if it is neglected, or postponed too long, it may then be impossible to prevent deformity from taking place.

The above indication is to be fulfilled, by applying a splint to the outside of the limb, & allowing it to extend from the heel to the bony eminence. Being held in this position, if the joint becomes anchylosed, which it frequently does, & which is one of natures efforts to bring about a cure, the patient will have a more useful limb, than if it had been allowed to rest in any other position

joints remaining long in any position, particularly when it is unnatural, with drawing up the leg to relieve pain in inflammation, or after operations, are apt to leave deformed stiffness in recovering, without any disease of the knee existing. There is a case of this kind in the hospital at present, where the patient had an operation performed on himself for incurable. He was placed in the recumbent posture on several occasions, & the drawing up his thigh to relax the muscles, & relieve pain has left a considerable deformed, & which he may however, ultimately be relieved.

4th Wounds.

a. Incised wounds. To approximate the lips of an incised wound, & maintain them in apposition, it is requisite that a proper posture be selected, which if not attended to, union of the wound by the first intention will be prevented, & a wound which might have healed in a few days, is made to

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occupy much more time in being cured. In transverse wounds, the part must be so placed as to relax the muscles, & the same position which relaxes the muscles & tendons, will also relax the integuments. A higher position with a bandage applied, will frequently keep the lips of a wound in contact without using adhesive strips or sutures.
As a general rule in incised wounds of flexor muscles, the limb ought to be flexed, if it be the extensor muscles which are injured, the extended position will assist in bringing the parts together.
But in longitudinal wounds of the extremities, the relaxed posture will not always be that which is most calculated to approximate the divided parts. Thus in longitudinal wounds of the extensor muscles of the thigh, the flexed position will be best adapted for drawing the parts together.
I saw a case of incised wound in the Hospital in July last, in which the importance of position

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was strikingly illustrated. A man had received a transverse wound in the thigh, by a cradling scythe, in a harvest field. The wound was in the superior & posterior part of the thigh, & in depth, extended to the bone. Its situation was such as to leave the largest vessels untouched, or it must have speedily proved fatal by profuse hemorrhage.

The patient was placed in the recumbent posture, & on his abdomen, the wound was then easily closed by sutures, & adhesive strips. By keeping him in this position, in about ten days, one of the most extensive wounds was united by the first intention.

With the view of suspending hemorrhage in wounds, it is frequently advantageous to elevate the part wounded, to diminish the force of the circulation.

6. Punctured wounds.

Contused & punctured wounds are very liable to be followed by a high degree of inflammation, & it is therefore often useful, to keep the part elevated.

* Gibson Surgery Vol 1. page 161.

is as to drain off blood, & act as a local depletion.

c. Wounds of particular parts.

Wounds of the neck. Patients affected by mental derangement, are most frequently the subjects of these wounds, & it is therefore often difficult to keep the head in a proper position. If the head be thrown back, the lips will separate, & the wound will gape, & assume a frightful appearance. But if the chin is brought forward, the aperture becomes closed, & the parts have a more natural appearance. Surgeons therefore, generally recommend the chin to be brought forward, & supported on the breast, & to be confined in this position. Dr. Gibson says the practice is objectionable, "inasmuch as the parts overlap, & uniting irregularly, & in an unnatural position, create deformity, & leave an ugly gap".*

This plan is to use a common leather stock, similar to those worn by military men, which being slightly confined to the neck, supports the chin, &

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keeps the head in a natural position. In wounds on the back of the neck, it is obvious, the position of the head must be the reverse of that for wounds anteriorly. To support the head, & keep the wound properly approximated, a particular bandage has been invented, which is described in Allan's Surgery. The recumbent posture is necessary in wounds of the abdomen, to relax the muscles, & integuments, & to throw the weight of the abdominal contents on the spine.

d. Wounds of veins.

A leading object in wounds of the veins, is to empty them as much as can be done, by the position of the limb. And this should be such, as to drain the veins, & allow of the gravitation of the blood to the heart. In the arm, & leg, an elevated position will have this effect, & prevent the accumulation of blood, & too great distention of the veins, which might interfere with reunion.

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I might next proceed in the consideration of position, in various other diseases, & accidents; such as diseased spine, Hernia, fractures & dislocations, & indeed almost every surgical disease; but this would lead me far beyond the limits I had originally prescribed for myself. Some of the most important, practical indications, so far as position is concerned, have been alluded to, & I must now conclude this essay, hoping that it may meet the approbation of those, to whom it is submitted.

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